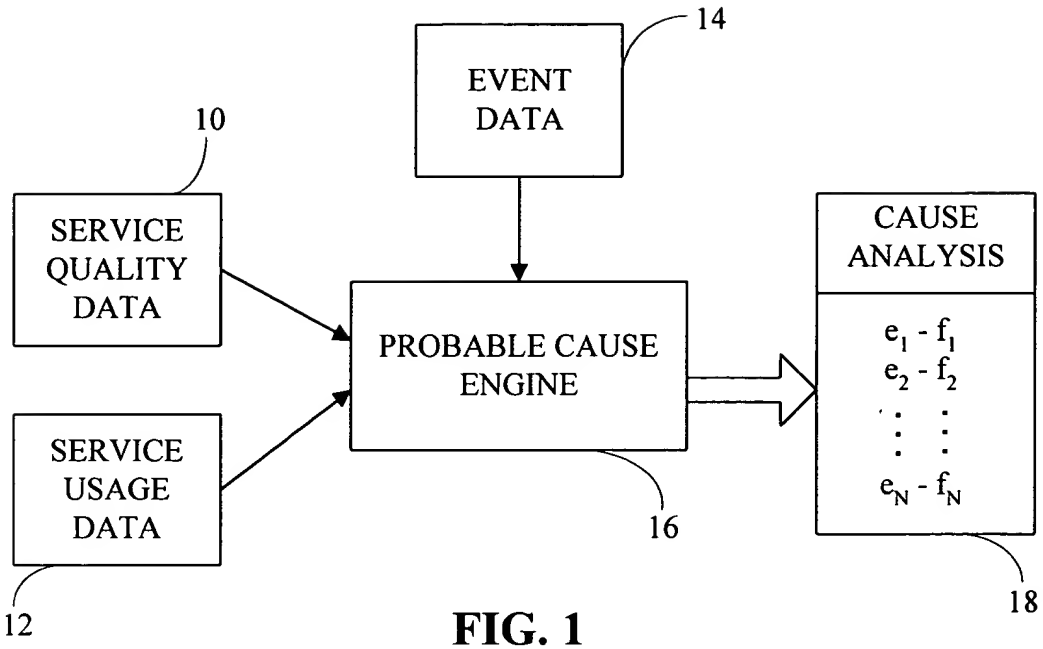
14
EVENT DATA
10
SERVICE QUALITY DATA
SERVICE USAGE DATA
PROBABLE CAUSE ENGINE
CAUSE ANALYSIS
e_1 - f_1
e_2 - f_2
e_N - f_N
16
18
12

FIG. 1

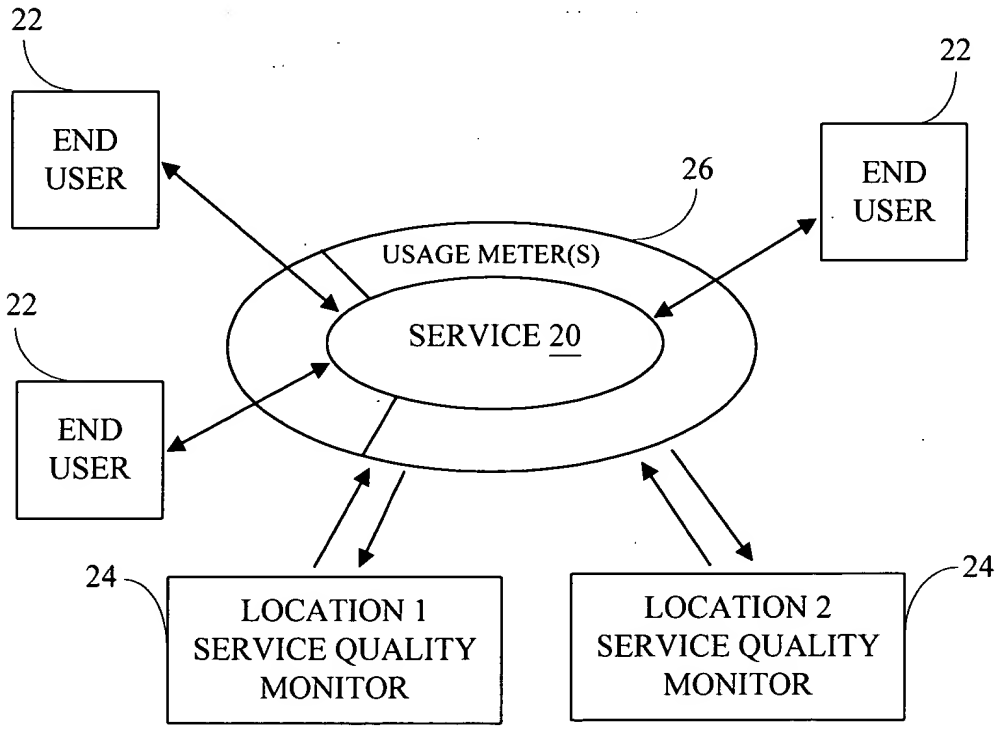
22
END USER
22
END USER
26
USAGE METER(S)
SERVICE 20
22
END USER
24
LOCATION 1 SERVICE QUALITY MONITOR
LOCATION 2 SERVICE QUALITY MONITOR
24

FIG. 2

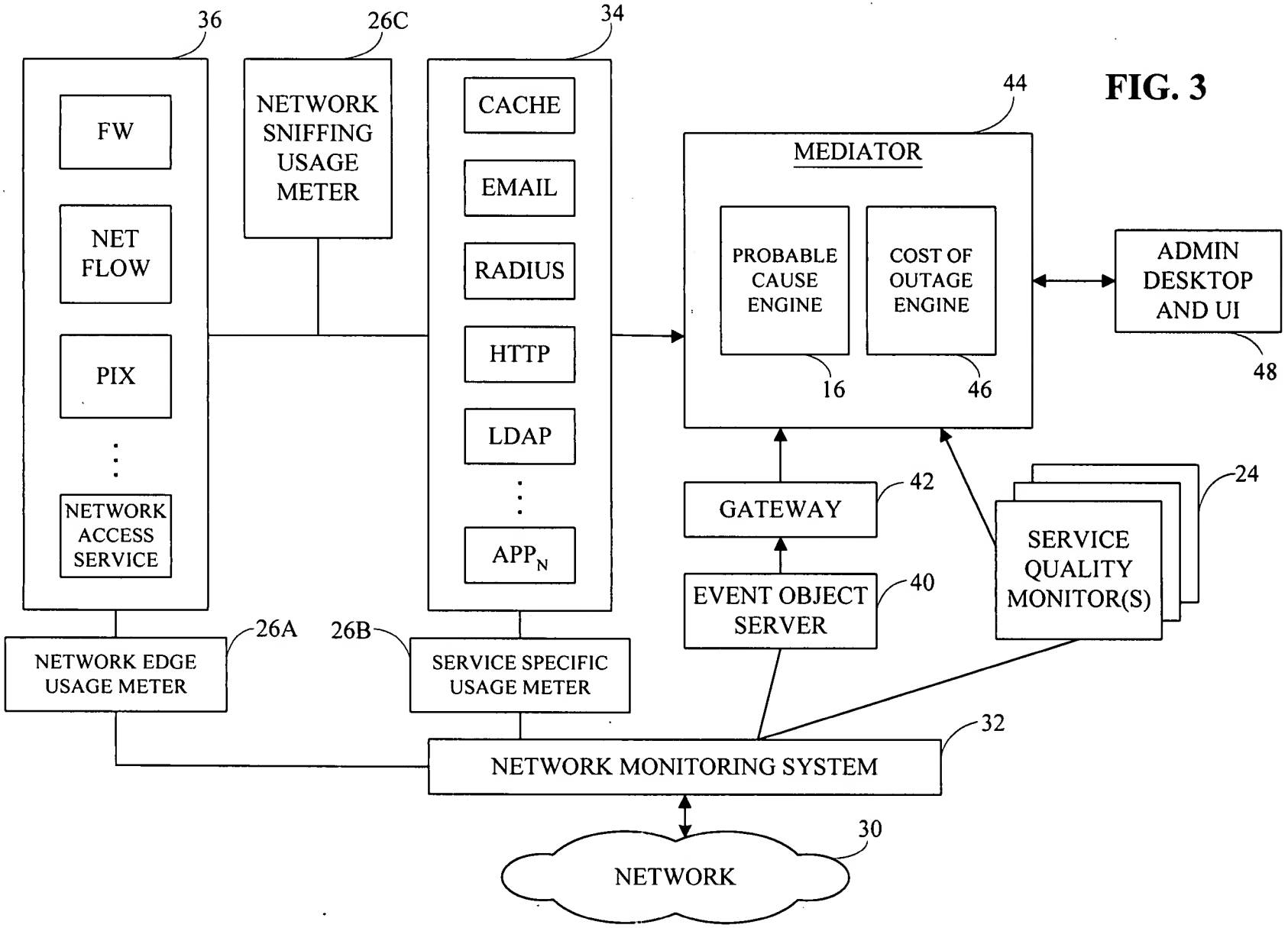
36
26C
34
FW
NET FLOW
PIX
NETWORK ACCESS SERVICE
NETWORK SNIFFING USAGE METER
CACHE
EMAIL
RADIUS
HTTP
LDAP
APP$_N$
44
MEDIATOR
PROBABLE CAUSE ENGINE
COST OF OUTAGE ENGINE
16
46
ADMIN DESKTOP AND UI
48
GATEWAY
42
EVENT OBJECT SERVER
40
SERVICE QUALITY MONITOR(S)
24
NETWORK EDGE USAGE METER
26A
26B
SERVICE SPECIFIC USAGE METER
NETWORK MONITORING SYSTEM
32
NETWORK
30

FIG. 3

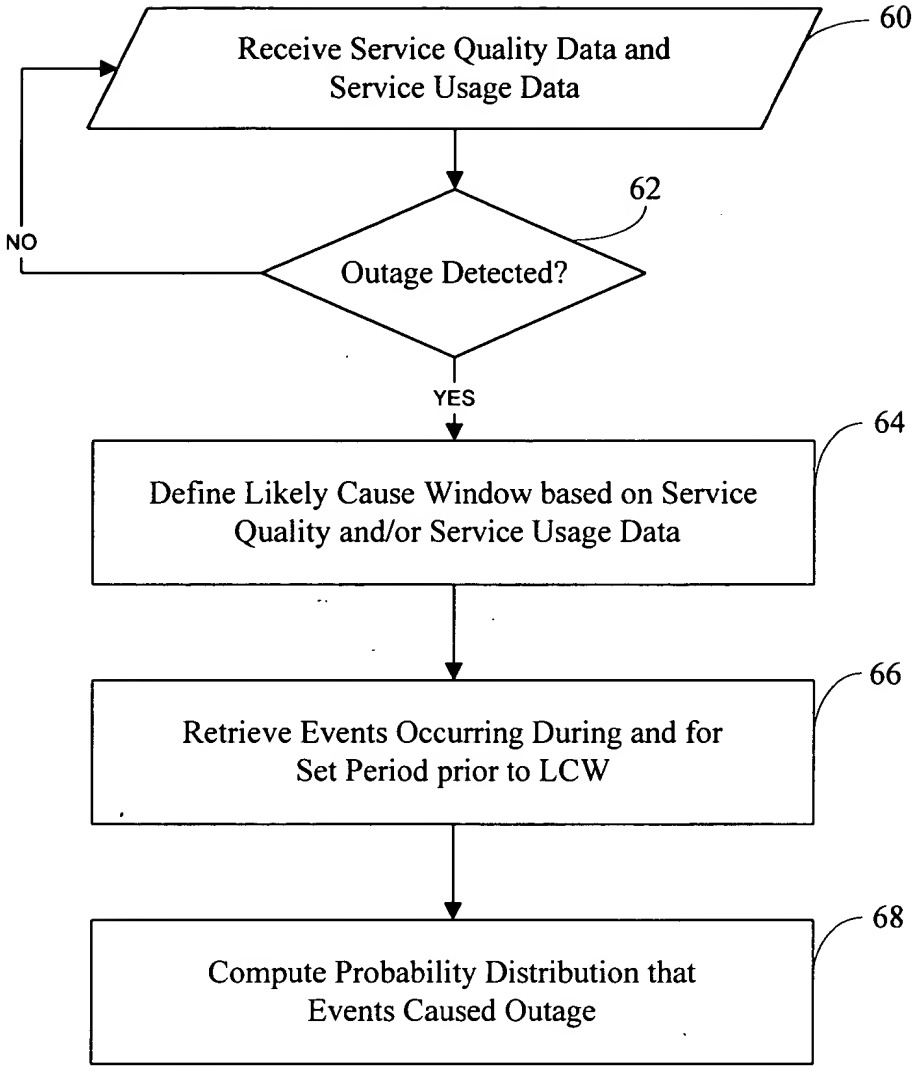
Receive Service Quality Data and Service Usage Data
60
62
Outage Detected?
NO
YES
Define Likely Cause Window based on Service Quality and/or Service Usage Data
64
Retrieve Events Occurring During and for Set Period prior to LCW
66
Compute Probability Distribution that Events Caused Outage
68

FIG. 4

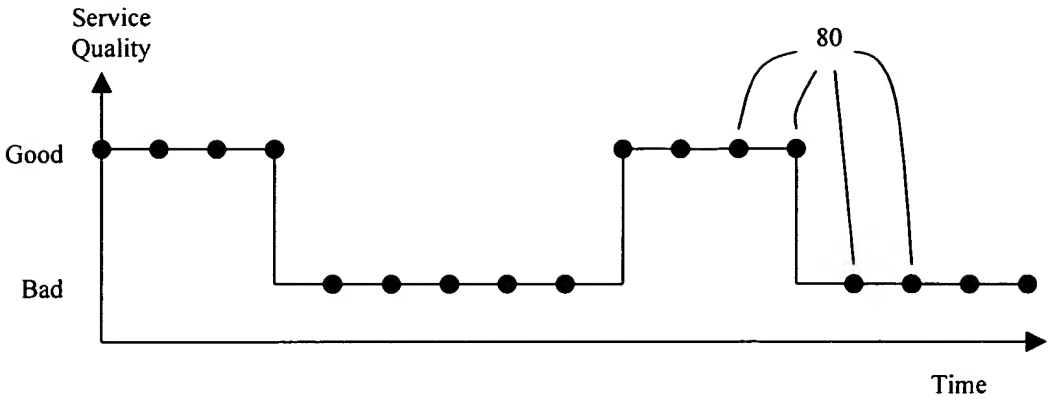

Fig. 5

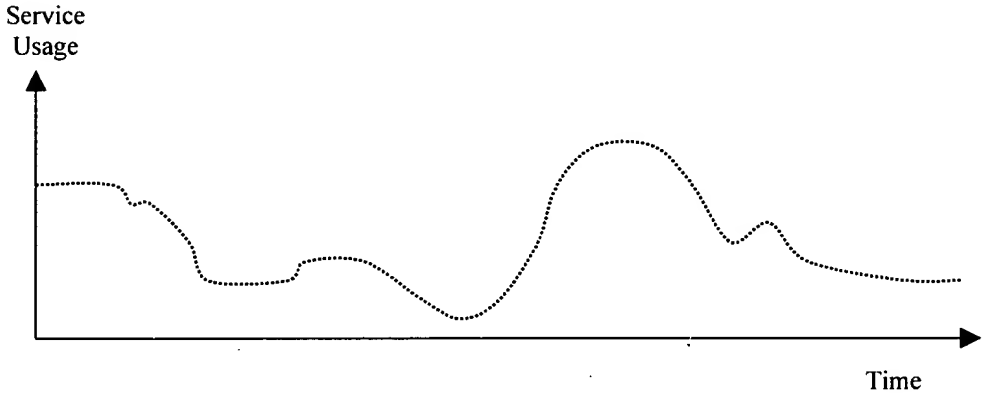

Fig. 6

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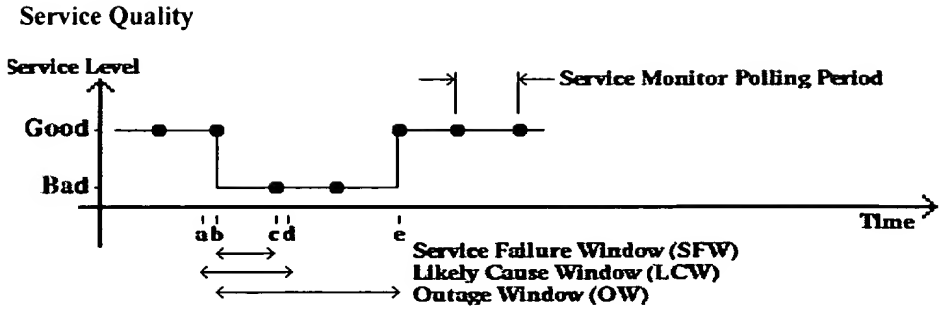

FIG. 7

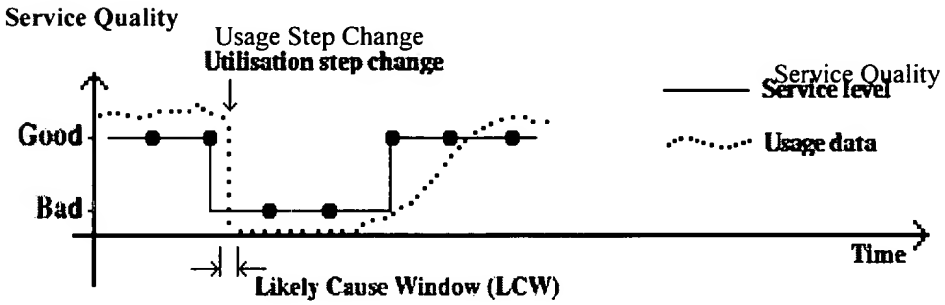

FIG. 8

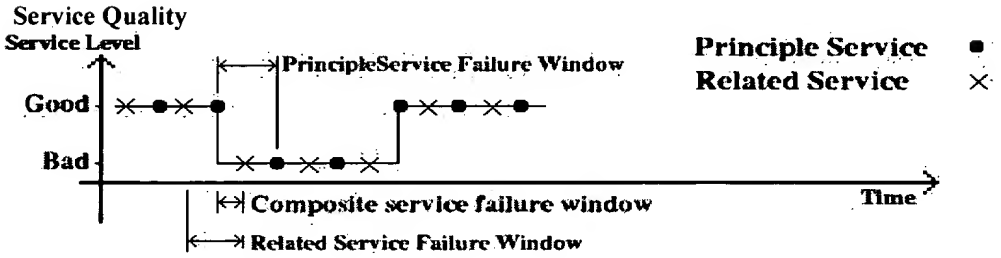

FIG. 9

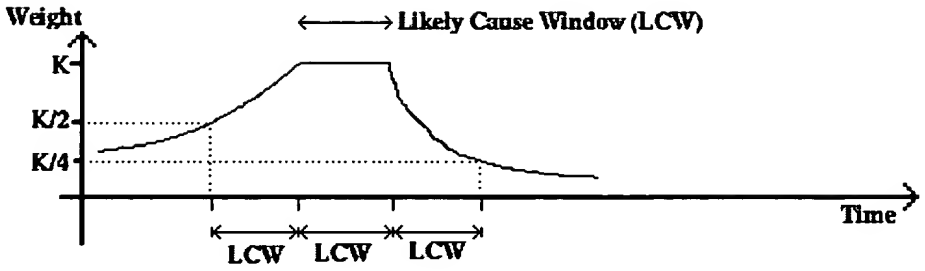

FIG. 10

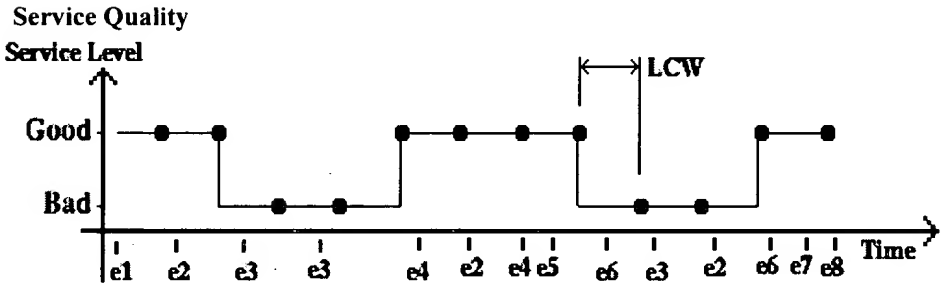

FIG. 11

Event	T(e)	FO(e)	PO(e)	U(e)	F(e)	P(e)
e3	2.11	1.00	4	1	8.44	0.5072
e6	4.00	0.50	2	1	4.00	0.2404
e2	1.24	0.25	2	4	2.48	0.1488
e5	2.61	0.50	1	1	1.31	0.0785
e4	1.38	0.25	1	1	0.34	0.0207
e7	0.07	0.50	1	1	0.03	0.0021
e1	0.06	0.50	1	1	0.03	0.0019
e8	0.02	0.50	1	1	0.01	0.0005
				Total:	16.64	1.0000

FIG. 12

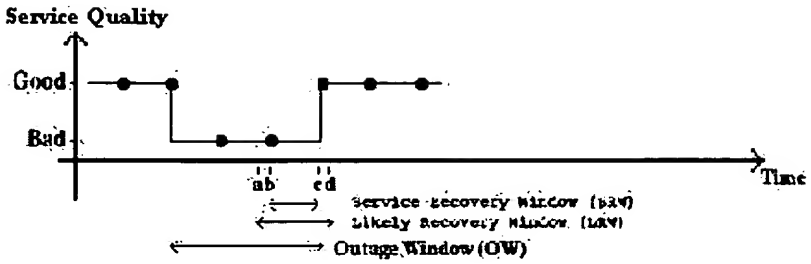

Fig 13

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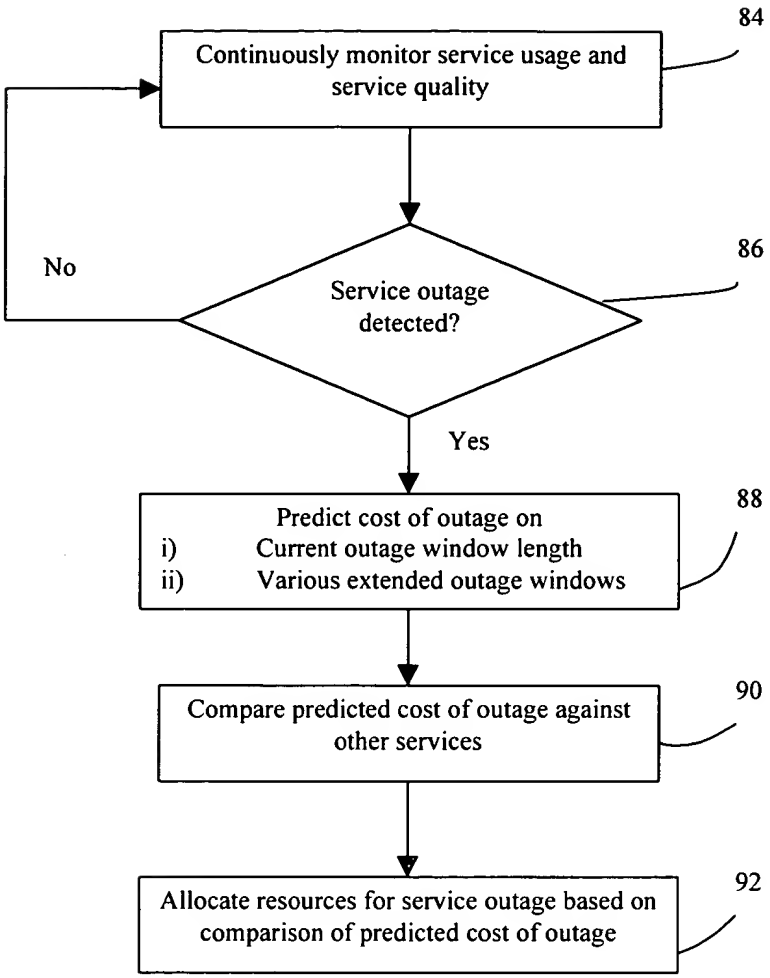

FIG. 14

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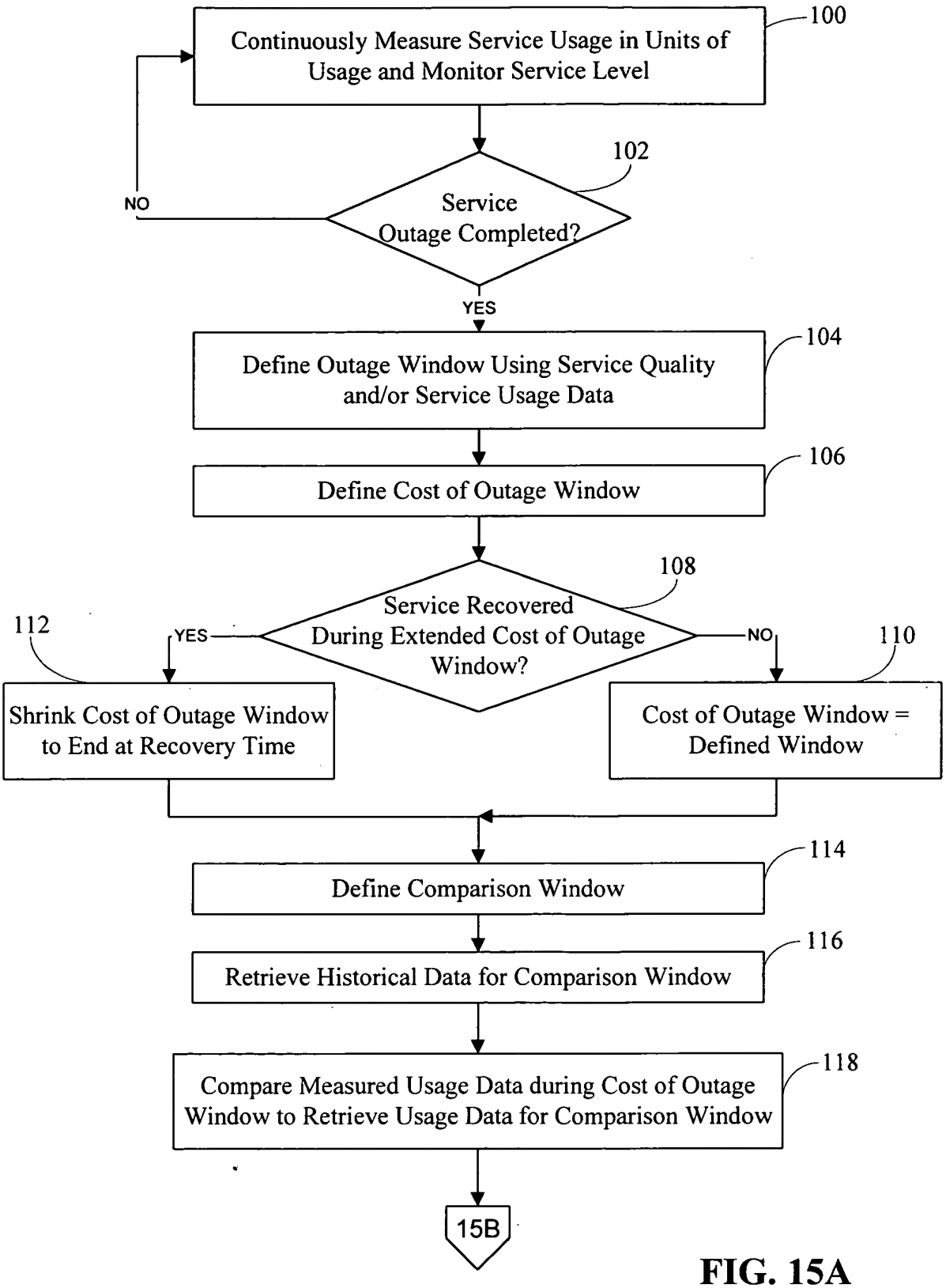
Continuously Measure Service Usage in Units of Usage and Monitor Service Level
100
Service Outage Completed?
102
NO
YES
Define Outage Window Using Service Quality and/or Service Usage Data
104
Define Cost of Outage Window
106
Service Recovered During Extended Cost of Outage Window?
108
YES
NO
112
110
Shrink Cost of Outage Window to End at Recovery Time
Cost of Outage Window = Defined Window
Define Comparison Window
114
Retrieve Historical Data for Comparison Window
116
Compare Measured Usage Data during Cost of Outage Window to Retrieve Usage Data for Comparison Window
118
15B

FIG. 15A

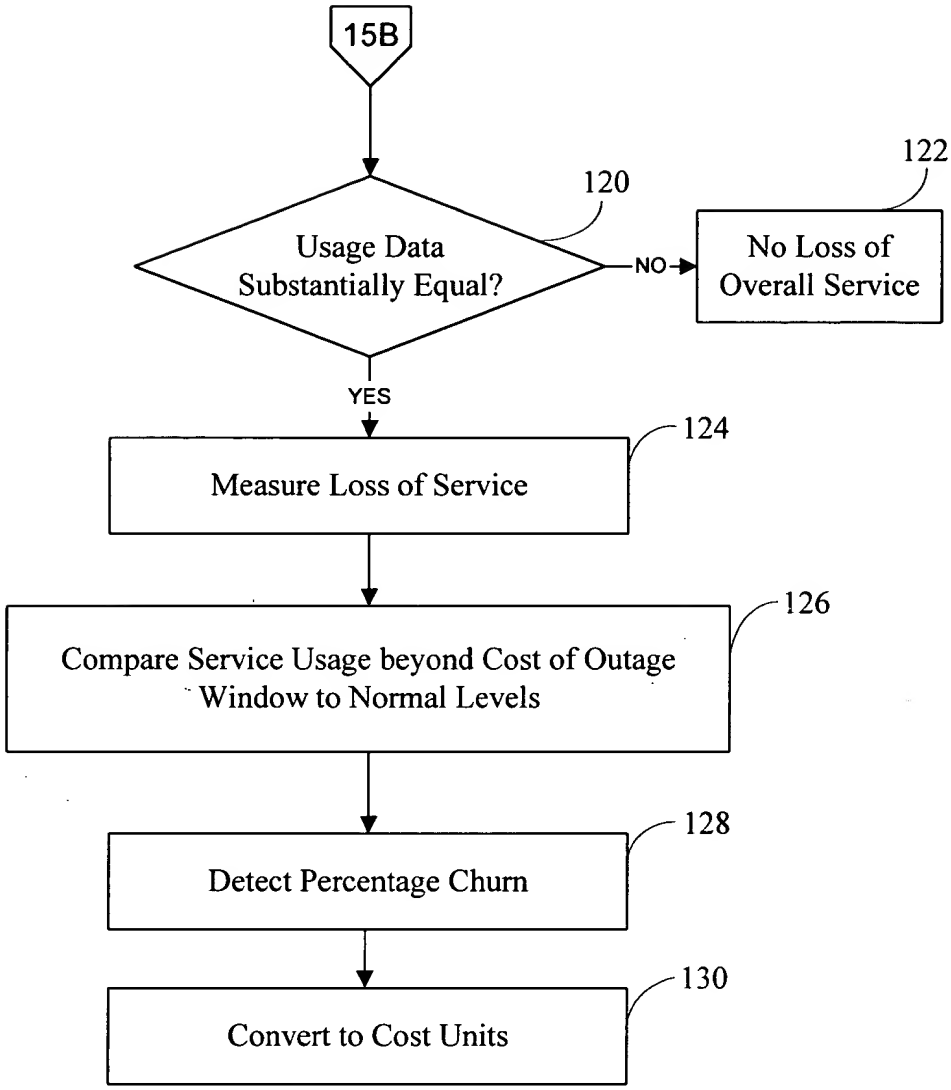
15B
120
Usage Data Substantially Equal?
NO
122
No Loss of Overall Service
YES
124
Measure Loss of Service
126
Compare Service Usage beyond Cost of Outage Window to Normal Levels
128
Detect Percentage Churn
130
Convert to Cost Units

FIG. 15B

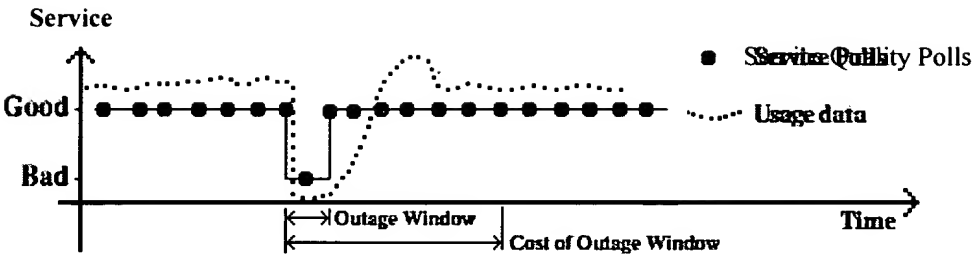

FIG. 16

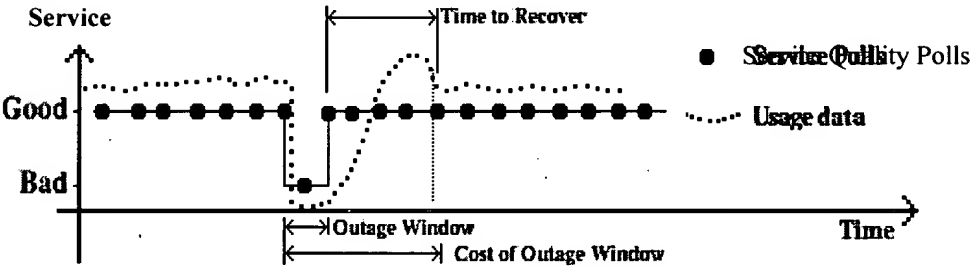

FIG. 18

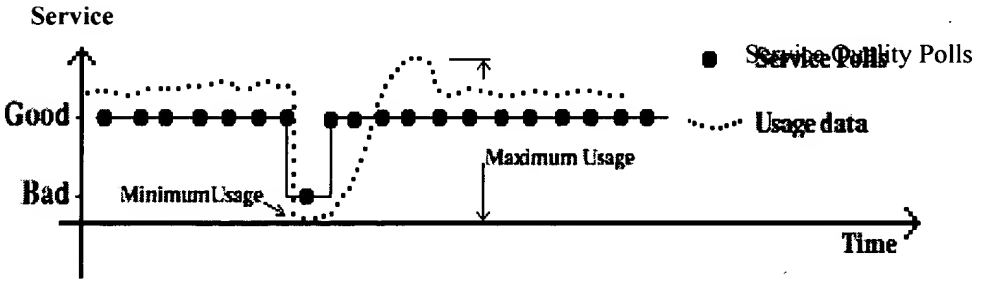

FIG. 19

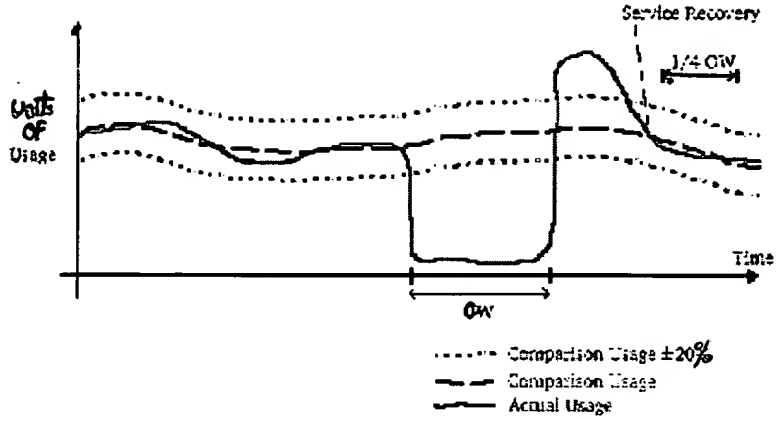

FIG. 17

DRAFT - 11/10/05

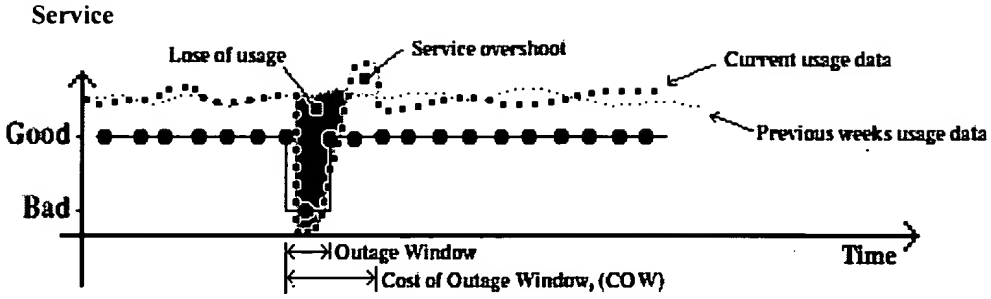

FIG. 20

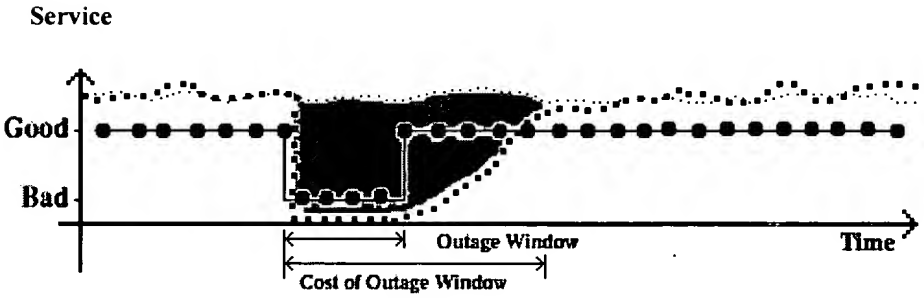

FIG. 21

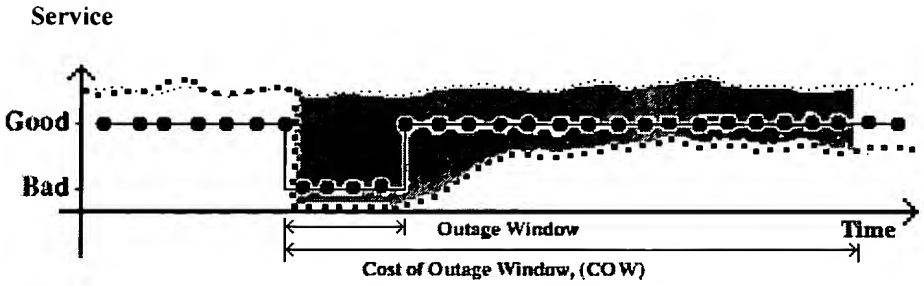

FIG. 22

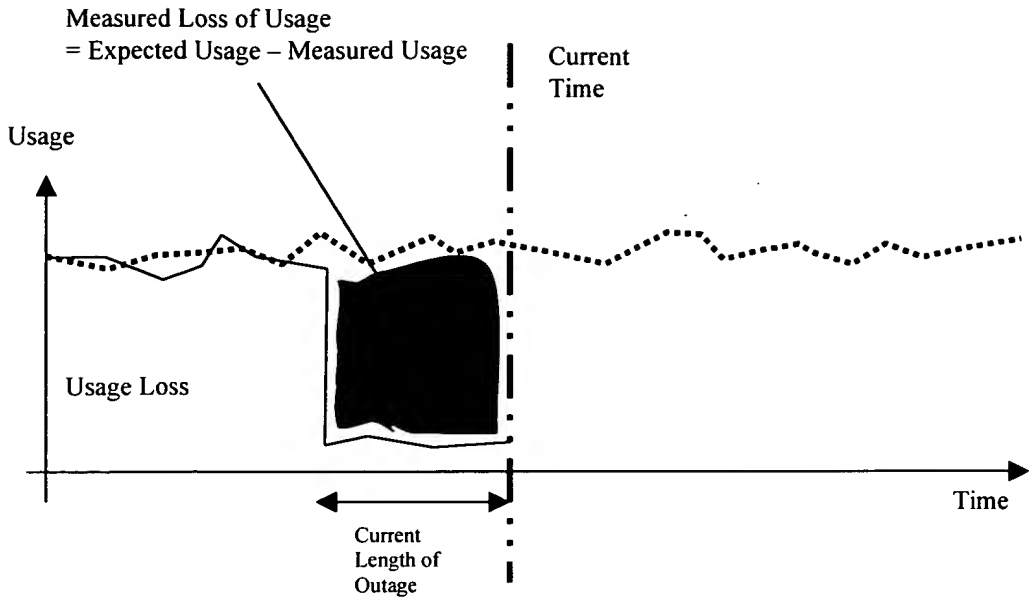

FIG. 23

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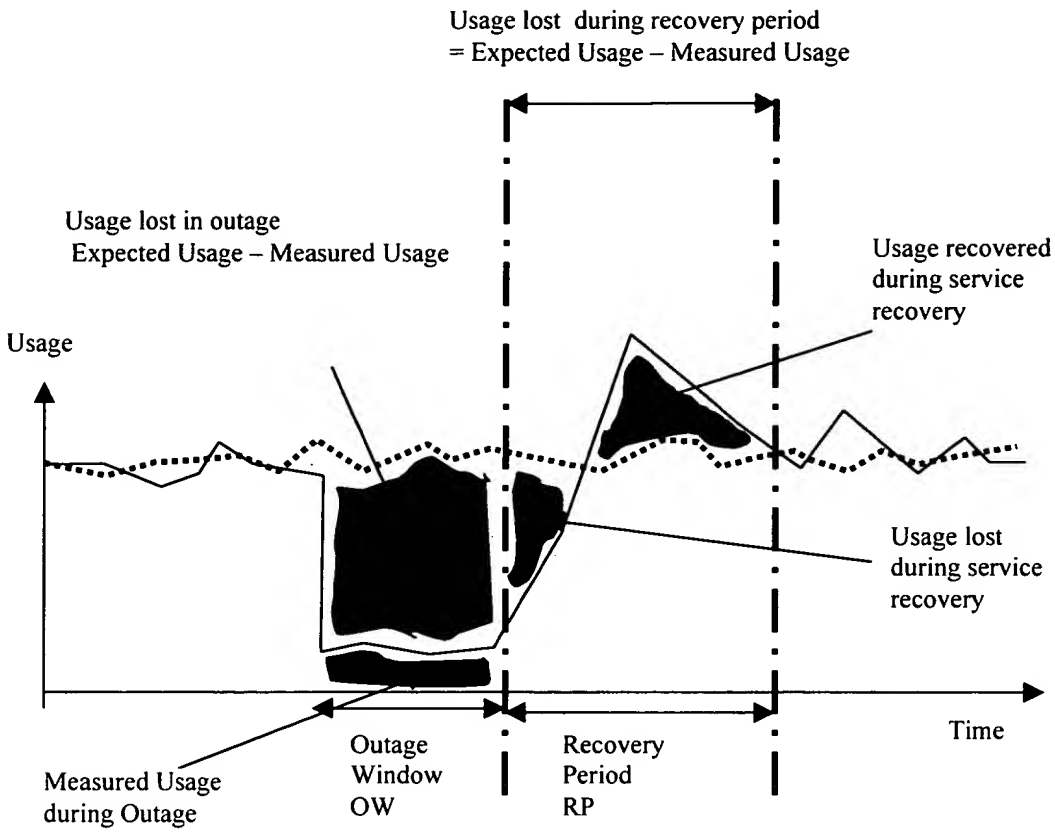

FIG. 24

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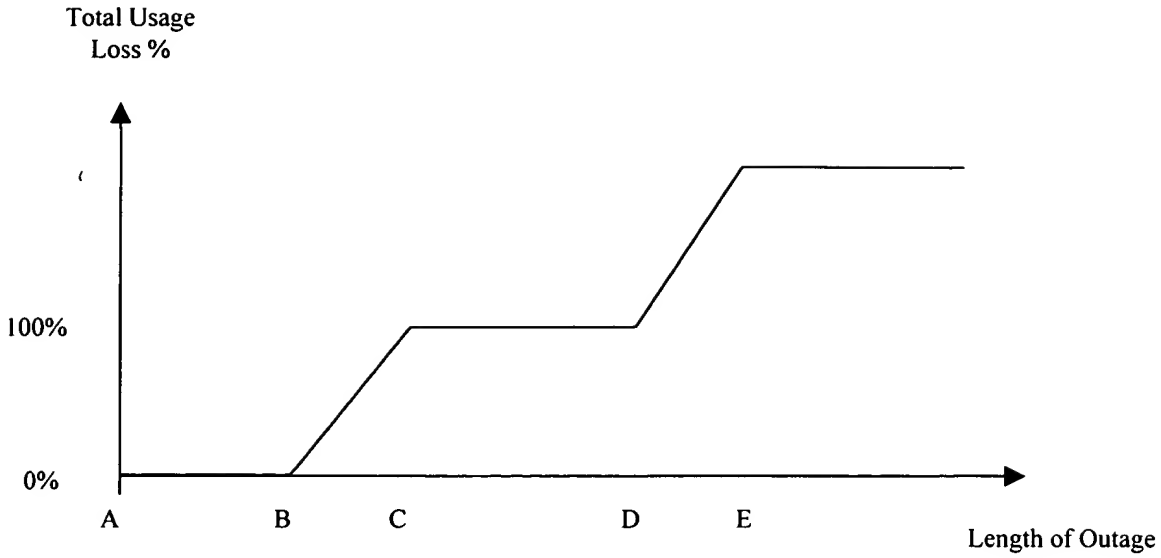

FIG. 25

Document Retrieved from Patent Application Publication

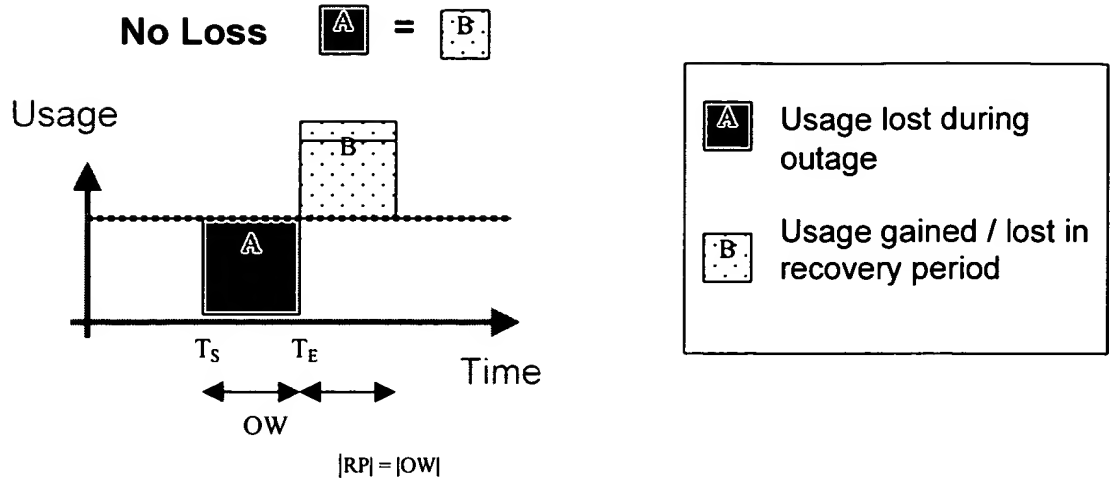

FIG. 26

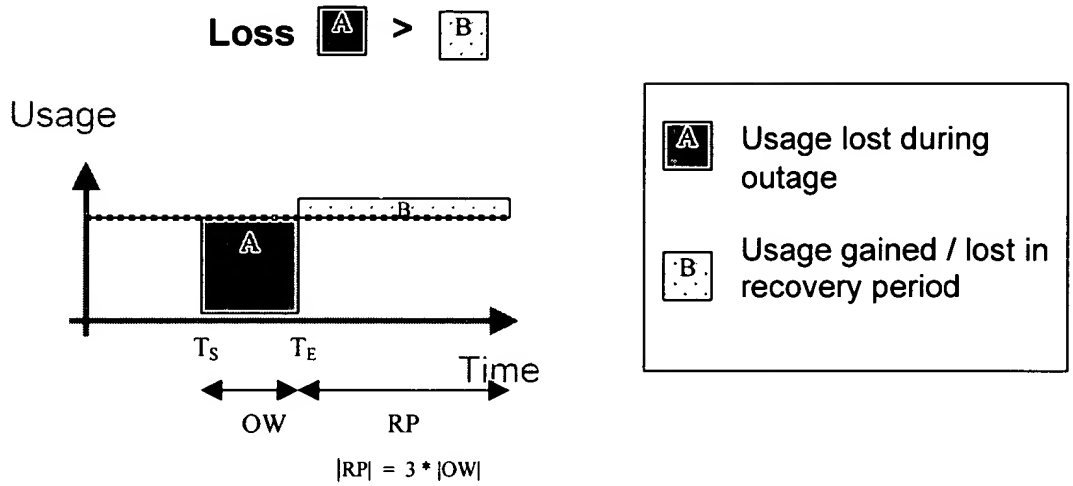

FIG. 27

Document 3 - Page 3 of 3

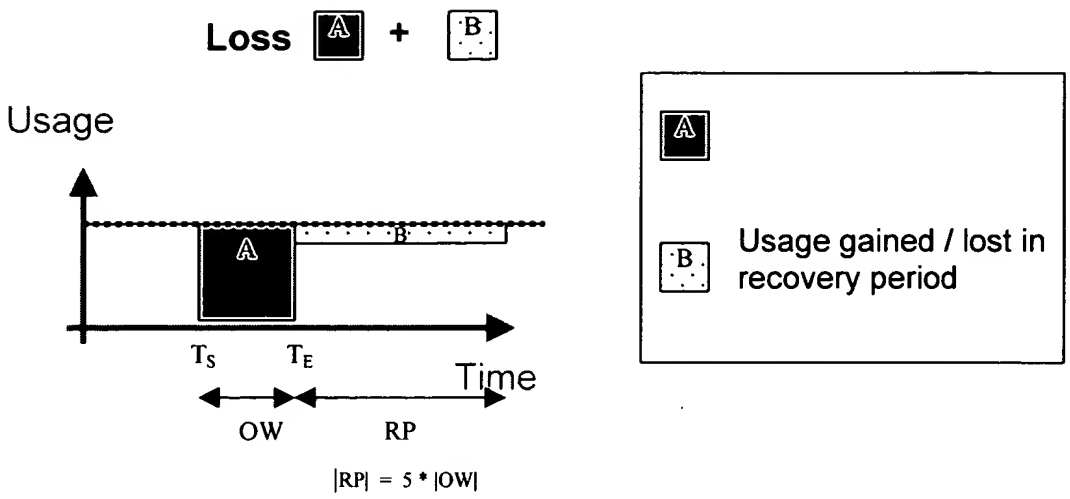

FIG. 28

Application Number: 14/026,350